भारतीय मानक
Indian Standard

IS 5543 : 2023

एलपीजी के साथ उपयोग के लिए बैन्स मैरी — विशिष्टि

(पहला पुनरीक्षण)

Bains Marie for Use with LPG — Specification

(First Revision)

ICS 27.060.10

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Price Group 6

Domestic and Commercial Gas Burning Appliances (Pressure Type) Sectional Committee, MED 23

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Domestic and Commercial Gas Burning Appliances (Pressure Type) Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first issued in 1970. This standard is being revised again to keep pace with the latest technological developments and international practices. Also, in this revision, the standard has been brought into latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated. BIS certification marking clause has been modified to align with the revised *Bureau of Indian Standards Act*, 2016.

Bains Marie equipment are used for warming of food or of crockery and other culinary equipment.

Compliance with this standard does not of itself guarantee that satisfactory service will be attained. Conditions of use vary greatly and it is necessary to relate the standards of performance to the actual use to which the appliance will be subjected during its life.

This standard is one of the series of Indian Standards on various domestic and commercial gas burning appliances (pressure type) used with liquefied petroleum gases standard.

IS 5116 : 2020 is a necessary adjunct to this should, however, any deviation exist between the requirements given in IS 5116 : 2020 and those of this standard, provisions of the latter shall apply.

The composition of the committee responsible for the formulation of this standard is listed in Annex F.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’ The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BAINS MARIE FOR USE WITH LPG — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies the constructional and performance requirements of wet heat and dry heat bains marie for use with liquefied petroleum gases at a working pressure of 30 gf/cm^2.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. In case the standards are to be referred in this clause they are to be listed as follows:

IS No.	*Title*
IS 5116 : 2020	Domestic and commercial equipment for use with LPG — General requirements (*fourth revision*)
IS 6480 : 1988	Glossary of terms relating to domestic and commercial gas-burning appliances (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions, in addition to those given in IS 6480, shall apply.

3.1 Bains Marie — An appliance for keeping cooked food hot in bulk.

3.2 Open Bains Marie — A shallow receptacle containing water and heated from below. Pots and pans containing cooked food are stored in it to be kept hot.

3.3 Fitted Bains Marie (Wet) — Same as open bains marie except that the top is covered with containers fitted into it. Cooked food is transferred to these containers to be kept hot.

3.4 Fitted Bains Marie (Dry) — Same as wet heat bains marie without a water well in which the containers are kept hot by the circulation of thermostat controlled hot air.

4 MATERIAL

The relevant material requirements given in Section 1 of IS 5116 shall apply.

5 CONSTRUCTION

In addition to the relevant constructional requirements given in Section 1 of IS 5116, the requirements given in **5.1** and **5.2** shall apply.

5.1 A wet bains marie filled to the level recommended by the manufacturer shall not have boiled dry two hours after lighting with the gas tap full on and the thermostat, if variable, turned to its maximum setting. The test shall be conducted at an inlet pressure to give 120 percent of normal rating.

5.2 A fixed setting thermostat shall be set to within ± 5 °C of the nominal working temperature.

6 PERFORMANCE

In addition to the relevant performance requirements in Section 2 of IS 5116, requirements given in **6.1** to **6.3** shall apply.

6.1 Combustion

When sampled as detailed in **6.1.1** the CO/CO_2 ratio shall not exceed 0.02 percent with individually heated sections operating alone and also in conjunction with associated units

6.1.1 The variable thermostat shall be set at its maximum setting and then the gas lighted. Sample of the products of combustion shall be taken after 15 minutes from the flue outlet.

6.2 Requirements for Wet Heat Bains Marie

6.2.1 *Heating Test*

When tested as given in Annex A, the time required to heat the water in the bains marie well from 15 °C to 80 °C shall not be more than 60 minutes using Test Gas A.

6.2.2 *Temperature Maintenance Test*

When tested in accordance with Annex B, the heat input required to maintain water in the bains marie well at average of 65 °C above room temperature using test gas. A shall not exceed 4 000 kcal/h for a bains marie of less than 0.4 m^2 in area or 2 700 kcal/h for a bains marie of area of 0.4 m^2 or over.

6.3 Requirement for Dry Heat or Steam Heat Bains Marie

6.3.1 *Heating* Test

When tested in -accordance with Annex C, the heating time required before water in the container be maintained at a temperature rise of 65 °C above room temperature using Test Gas A shall not exceed 45 minutes.

6.3.2 *Temperature Maintenance Test*

When tested as given in Annex D, the heat input required to maintain the temperature of water in the fitted containers at an average of 65 °C above room temperature using test gas. A shall not exceed 4 000 kcal/h for bains marie with 0.4 m^2 in area and 2 700 kcal/h for a bains marie in area of 0.4 m^2 or above.

6.3.3 *Food Warming Test*

When tested in accordance with Annex E, it shall be possible to maintain the food at a temperature not lower than 70 °C in the containers without overheating using Test Gas A.

7 INSTRUCTIONS

The necessary instructions as given in **24** of IS 5116 shall be supplied with the appliance.

8 MARKING

8.1 Each 'Bains marie' shall be legibly and indelibly marked with the following:

a) Manufacturer’s name, initials or registered trade-mark;
b) Type number or name which differs from that of other models for other fuels, that is, coal gas or natural gas;
c) The words ‘for use with butane/ propane at 2.942 kN/m^2 (30 gf/ cm^2)’;
d) Any special instructions for the safe operation;
e) Country of origin; and
f) Temperature chart corresponding to the thermostat settings, if thermostat is provided.

8.2 The information given in **8.1** shall bedistinct, permanent and easily accessible when the appliance is installed as it would be in service.

8.2 BIS Certification Marking.

The Baine Marie may also be marked with Standard Mark.

8.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

9 PACKING

The requirements given in **25** of IS 5116 shall apply.

ANNEX A

(*Clause* 6.2.1)

HEATING TEST FOR WET HEAT BAINS MARIE

A-l OBJECT

To determine the time required to heat the water in the bains marie well from 15 °C to 80 °C using Test Gas A.

A-2 PROCEDURE

Remove any base plates and cover the well with a lid of 1.25 mm thick galvanized mild steel sheet drilled to accommodate one thermometer for each half metre length of pan, with stirrers arranged between the thermometers: if fitted containers are supplied these shall be removed and the aperture left in the bains marie shall be covered with a lid 1.25 mm thick sheet galvanized mild steel drilled to accommodate a thermometer and stirrers. Fill the well with a weighed quantity of water at 15 °C ± 1 °C to the depth recommended by the manufacturer, recording the initial temperature. Turn the thermostat, unless fixed, to its maximum setting; in the absence of a thermostat turn the gas tap full on. Light the burner and simultaneously start the stop watch and take thermometer reading; commence stirring when an average temperature of 65 °C is reached. When the average temperature reaches 75 °C turn the gas off and stop the watch. Assess the heating time for the average temperature to rise through 65 °C.

ANNEX B

(*Clause* 6.2.2)

TEMPERATURE MAINTENANCE TEST FOR WET HEAT BAINS MARIE

B-1 OBJECT

To determine the heat input required to maintain the water in the bains marie well at an average temperature of 65 °C above room temperature using Test Gas A.

B-2 PROCEDURE

Arrange the apparatus as described in Annex A and measure the maintenance heat input at a convenient number of temperatures. Plot a graph of maintenance gas rates and temperature, and obtain by interpolation the heat input corresponding to a rise of 65 °C above room temperature. Divide the figure obtained by the area of the bains marie well containing the water.

ANNEX C

(*Clause* 6.3.1)

HEATING TEST FOR DRY HEAT OR STEAM-HEAT BAINS MARIE

C-l OBJECT

To determine the heating time required before water in the containers can be maintained at a temperature rise of 65 °C above room temperature using Test Gas A.

C-2 PROCEDURE

Position thermometers with their bulbs inserted 50 mm below the container covers. Fill each container with boiling water to within 25 mm of the top and allow the containers to cool until their average temperature is 75 percent. Turn the thermostat, unless fixed, to its maximum setting; in the absence of a thermostat, turn the gas full ‘ON’. Light the burner and note the time taken for the average temperature to recover to 75 °C.

Assess the heating time as follows:

$$\text{Heating time} = \frac{\text{Time taken for recovery of average temperature} \times 65}{75 - \text{Room temperature}}$$

ANNEX D

(*Clause* 6.3.2)

TEMPERATURE MAINTENANCE TEST-FOR DRY HEAT OR STEAM HEAT BAINS MARIE

D-1 OBJECT

To determine the heat input required to maintain the temperature of water in the food containers at an average of 65 °C above room temperature using Test Gas A.

D-2 PROCEDURE

Fill each food container with water to 25 mm from the top and cover with a lid of l.25 mm galvanized mild steel sheet drilled to accommodate a centrally disposed thermometer.

Allow the bains marie to heat up to equilibrium and measure the maintenance heat input at a convenient number of temperatures by adjusting the thermostat or gas tap. Plot a graph of the maintenance heat inputs and temperatures and obtain by interpolation the heat input corresponding to a temperature rise of 65 °C above room temperature. Divide the figure obtained by the area of the bains marie top in square metres.

ANNEX E

(*Clause* 6.3.3)

FOOD WARMING TEST FOR DRY HEAT BAINS MARIE

E-1 OBJECT

To determine whether food can be maintained at a temperature not lower than 70 °C in the containers without overheating or scorching, using Test Gas A.

E-2 PROCEDURE

Place the food containers in the appliance and cover with the lids. Set the thermostats (if any) as recommended by the manufacturer and turn the gas tap full on. Light the burner and allow the appliance to heat up for 45 minutes. The quantity of food (porridge) required for the test is previously ascertained by filling the containers with water to the level of the surrounding bains marie. This water is transferred to a pan. Adding 50 g of rolled oats to each half litre of water in the pan, cook thoroughly by bringing to a quick boil and then simmering for 10 minutes. Stir continuously at first and occasionally while simmering. Cool to 85 °C to 88 °C and pour the required amount into each container. Replace the lids.

E-3 OBSERVATIONS

The following tests are run consecutively using Test Gas A:

a) Stir the mixture well every 10 minutes and note the temperature reading. After 50 minutes examine for thickness of deposit on sides and base, sticking or burning.

b) If the above requirements are met, return the mixture to the containers, reheating to 85 °C to 88 °C if necessary. Remove the lids and repeat the test for further 60 minutes. In this time, the temperature shall not have dropped more than 5 °C of its starting point and the deposits shall comply with the requirements in (a) above.

c) If the above requirements are met, do not reheat but leave the porridge undisturbed for a further 30 minutes and again measure the temperature in each container. Empty the contents and examine for sticking and scorching. In this time, the temperature shall not fall during the last 30 minutes more than 5 °C below the temperature at the start of this part of the test. The deposit shall not stick to such an extent that it cannot be removed by rubbing with a cloth.

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Domestic and Commercial Gas Burning Appliances Sectional Committee, MED 23

Organization	*Representative(s)*
L.P.G. Equipment Research Centre, Bengaluru	Shri Ashish Bera (***Chairperson***)
Agnisumukh, Bengaluru	Shri Hari Rao
BSH Household Appliances Manufacturing Private Limited, Chennai	Shri Vijay Kumar Loganathan
Bharat Petroleum Corporation Limited, Mumbai	Shri Hari Babu Banoth Shri Mohit Rane (*Alternate*)
Bureau of Energy Efficiency, New Delhi	Ms Pravatanalini Samal Shri Kamran Shaikh (*Alternate*)
Delton Industries, New Delhi	Shri R. C. Nangia Shri Vivek Nangia (*Alternate*)
Directorate General of Quality Assurance (Stores), Kanpur	Shri H. H. P. Tiwari
Gorani Industries Limited, Indore	Shri Anil Gorani
Goyal Engineers Private Limited, New Delhi	Shri Ajay Goyal Shri Neeraj Goyal (*Alternate*)
Hindustan Petroleum Corporation Limited, Mumbai	Shri Rakesh G. Khade Shri Subramani Siva shankar (*Alternate*)
Indian Institute of Petroleum, Dehradun	Shri Pankaj Kumar Arya
Indian Institute of Technology Guwahati, Guwahati	Shri Muthu Kumar
Indian Oil Corporation (Marketing), Mumbai	Shri J. Shyam Swaroop
Indraprastha Gas Limited, New Delhi	Shri Pawan Kumar Shri Anupe Francis (*Alternate*)
L.P.G. Equipment Research Centre, Bengaluru	Shri P. R. Deodhar
Petroleum Conservation Research Association, New Delhi	Shri Surendra Pratap
Ariston Thermo India Private Limited, Pune	Shri Abhijit Banshelkikar Shri Mahesh Bhangale (*Alternate*)
Rama Domestic Appliances, New Delhi	Shri Amarjeet Singh Kohli Shri Manmohan Krishnan (*Alternate*)
Shri Krishna Test House, New Delhi	Shri Sunil Talwar
Sunflame Enterprises Private Limited, Faridabad	Shri K. L. Verma Shri Sandeep Juneja (*Alternate*)
Superflame Enterprises Private Limited, Faridabad	Shri Vikram Verma

Organization	*Representative(s)*
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BIS Directorate General	SHRI RAJNEESH KHOSLA, SCIENTIST ‘F’/SENIOR DIRECTOR AND HEAD (MECHANICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI SANDEEP KESHAV
SCIENTIST ‘C’/ DEPUTY DIRECTOR
(MECHANICAL ENGINEERING), BIS

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